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Examining Temperament in Exercise Dependence and Eating Disorders

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California State University Research Competition
San Luis Obispo, CA
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Background

• Over exercise can have serious implications
• 25% - 55% in patients with eating disorders
• Health may be impaired in at-risk individuals
  – 20% - 40% mortality rate – highest of all mental illness
  – Over exercise is implicated in this
• Why do some people exercise too much?

Meyer & Taranis, (2011); Shroff et al., (2006)
Background

- Exercise Dependence (EXD) is defined as when exercise results in physical, psychological, and/or social detriments

Two distinct Variants:

- **Primary Exercise Dependence**
  - Exercise is the only problem

- **Secondary Exercise Dependence**
  - Exercise to facilitate other disorders
    - Most often - eating disorders

Background

- Temperament is an individual’s predisposition of self-regulation processes
  - Behavioral Activation System (BA)
    - impulsivity and seeking rewarding consequences
  - Behavioral Inhibition System (BI)
    - sensitivity to punishment, non-reward, novelty, anxiety, and depression

Carver & White, (1994)
Background & Gap

- Recent research has found
  - BA in *elite athletes* with EXD
  - BI in *hospitalized inpatients* with eating disorders

My Research Question

Which temperament styles are associated with each EXD variant and eating disorders risk in a *general-population* based sample?

Müller et al., (2015)
Purpose & Hypotheses

• Purpose:
  – To examine temperament styles in EXD and eating disorders risk in a general-population based sample

• Hypotheses:
  – Individuals with eating disorders risk will be associated with **BI** temperament
  – Individuals with EXD will be associated with **BA** temperament

Müller et al., (2015)
Participants

• 880 individuals who completed an online survey
  – Mean age = 28.46±10.13
  – Mean Body Mass Index = 27.29±6.34
  – 63.92% female
  – 66.90% Caucasian
  – 42.41% never married/currently single
  – 29.60% earned a college diploma
  – 60.41% with an annual personal income of <$25k
  – 79.63% were not Hispanic or Latino
Measures

- **Demographics Questionnaire**

- **Exercise Dependence Scale (EDS)**
  - 21 Items measured on a 6-point Likert scale
  - Reliability in this study was excellent ($\alpha = 0.95$)

- **Eating Disorders Examination-Questionnaire (EDE-Q)**
  - 28-item questionnaire evaluating symptoms of an eating disorder
    - Continuous symptom score calculated to determine risk
    - Reliability in this study was excellent ($\alpha = 0.90$)

Measures

- **Leisure-Time Exercise Questionnaire (LTEQ):**
  - Self-report questionnaire that assesses 20 minute bouts of strenuous, moderate, and light intensity exercise

- **Behavioral Inhibition/Behavior Activation Scales (BIS/BAS):**
  - 24 item scale assessing BI & BA
  - BAS subscales – Drive, Fun Seeking, & Reward Responsiveness
  - Reliability in this study was good for the BIS ($\alpha = 0.81$) and BAS ($\alpha = 0.86$)

Carver & White, (1994); Godin & Shepard, (1985)
Procedures

- Reviewed and approved by IRB
- Informed consent collected prior to completing an online survey
- Participants were grouped as:
  - Regular exercisers (e.g., LTEQ > 24.00)
  - Primary EXD (e.g., EDS > 77.00 & EDE-Q < 2.98)
  - Secondary EXD (e.g., EDS > 77.00 & EDE-Q > 2.99)
  - Eating disorders risk only (e.g., EDS < 77.00 & EDE-Q > 2.99)
Statistical Analyses

One-Way ANOVA

• Overall group differences
  – Tukey Post Hoc analyses were conducted to examine individual group differences

• Dependent variables – BIS & BAS scores (continuous)
• Independent variables – Groups based on LTEQ, EDS, & EDE-Q scores (categorical)
## ANOVA Results

<table>
<thead>
<tr>
<th></th>
<th>Regular Exercisers M(SD)</th>
<th>Primary Exercise Dependence M(SD)</th>
<th>Secondary Exercise Dependence M(SD)</th>
<th>Eating Disorders Risk Only M(SD)</th>
<th>ANOVA df</th>
<th>F</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIS</strong></td>
<td>19.21 (4.16)</td>
<td>19.40 (4.25)</td>
<td>18.83 (4.01)</td>
<td>21.90 (4.15)</td>
<td>3, 841</td>
<td>27.13*</td>
<td>.088</td>
</tr>
<tr>
<td><strong>BAS</strong></td>
<td>39.27 (6.00)</td>
<td>39.62 (8.37)</td>
<td>37.25 (7.67)</td>
<td>39.50 (6.41)</td>
<td>3, 830</td>
<td>1.52</td>
<td>.005</td>
</tr>
<tr>
<td>BAS-Drive</td>
<td>11.16 (2.50)</td>
<td>11.70 (2.97)</td>
<td>10.79 (2.35)</td>
<td>11.02 (2.72)</td>
<td>3, 850</td>
<td>0.87</td>
<td>.003</td>
</tr>
<tr>
<td>BAS-Fun</td>
<td>11.44 (2.40)</td>
<td>11.56 (2.74)</td>
<td>11.20 (3.01)</td>
<td>11.67 (2.56)</td>
<td>3, 852</td>
<td>0.78</td>
<td>.003</td>
</tr>
<tr>
<td><strong>BAS-Reward</strong></td>
<td>16.68 (2.57)</td>
<td>16.35 (3.67)</td>
<td>15.20 (3.61)</td>
<td>16.89 (2.74)</td>
<td>3, 850</td>
<td>4.76*</td>
<td>.017</td>
</tr>
</tbody>
</table>

Table 1: Groups means for study outcomes and ANOVA results.

NOTES: BIS = Behavioral Inhibition Scale; BAS = Behavioral Activation Scale; M(SD) = Mean (Standard Deviation); df = degrees of freedom; * = p < .001; η² = effect size.
Figure 1: Group differences for Behavioral Inhibition and Behavioral Activation Scales

NOTE: BIS = Behavioral Inhibition Scale; BAS = Behavioral Activation Scale;
* = $p < .05$; ** = $p < .01$
Discussion

• Key Findings!!
• Hypothesis 1 – BI & eating disorders risk
  • Supported!
    – Eating disorders risk only group reported highest scores in overall BIS
• Hypothesis 2 – BA & exercise dependence
  • Partially Supported!
    – BAS Reward subscale only showed significant differences
Discussion

• General-population sample

• Provides new insights on temperament styles
  – Secondary EXD lowest BAS Reward
    • Exercise & eating disorder risk – may not be rewarding

• Temperament styles may be more heterogeneous than previously thought
  • More research needed on reward systems

Limitations

- Cross-sectional design
  - Can’t prove cause and effect

- Self-report measures - limits accuracy of assessments
  - No clinical diagnosis
    - EXD or eating disorders
  - No objective assessments of physical activity
Conclusions

• BAS may be more complex than previously reported

• Clinical implications
  – A person’s temperament may explain *why* they exercise
  • Tailor interventions to match temperament style

![Image: Exercise is a reward, not a punishment for eating.](image_url)
References

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- Dr. Cook for his mentorship
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Questions?